Entrepreneurial ecosystems as practices and resources

Entrepreneurial ecosystems as practices and resources:

Resource acquisition and co-production in Edinburgh and Glasgow

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Abstract

Entrepreneurial ecosystems, the social, economic, political, and cultural contexts that support high-growth entrepreneurship within a region, have emerged as a key topic of research and debate amongst both researchers as well as policymakers and entrepreneurs themselves. Current research on entrepreneurial ecosystems have focused primarily on identifying the core attributes or factors associated with strong ecosystems and in developing new methods to identify the strengths and weaknesses of various ecosystems. But less is known about how entrepreneurs engage with and draw resources from their ecosystem. This paper reports results from a pilot study with 37 high-growth entrepreneurs in Edinburgh and Glasgow, Scotland. Drawing on practice-based and Bourdieuian methodologies, interviews with entrepreneurs suggest that knowledge about the entrepreneurship process itself is a crucial resource in ecosystems and that the types of resources entrepreneurs gather from their ecosystem changes as the firms grow and based on the entrepreneurs' backgrounds. This suggests that entrepreneurial ecosystems are dynamic and heterogeneous and that entrepreneurs engage with them differently based on their unique needs.

Introduction

The study of entrepreneurial ecosystems has seen significant growth over the past several years, with numerous scholars and policymakers approaching the topic from a variety of different perspectives (e.g. Acs, Autio, & Szerb, 2014; Audretsch & Belitski, 2016; Auerswald,

2015; Autio, Kenney, Mustar, Siegel, & Wright, 2014; Borrissenko & Boschma, 2016; Isenberg & Onyemah, 2016; Mack & Mayer, 2015; Motoyama, Konczal, Bell-Masterson, & Morelix, 2014; Spigel, 2017; Stam, 2015). Building on prior work on entrepreneurial environments and the geography of entrepreneurship (Dubini, 1989; Malecki, 1997; Moore, 1993; Neck, Meyer, Cohen, & Corbett, 2004; Spilling, 1996; Van de Ven, 1993; Zacharakis, Shepherd, & Coombs, 2003), ecosystems represent a new direction for entrepreneurship research that simultaneously increases our knowledge of the complex contextual environment surrounding the entrepreneurship process while at the same time providing useful contributions to policy debates around the role of high-growth entrepreneurship as a driver of regional economic development.

However, as Stam (2015) argues, ecosystem research has been driven by a strong normative interest and lacks a strong conceptual foundation. As a result, while there has been substantial attention paid to identifying the particular attributes or factors associated with strong entrepreneurial ecosystems (e.g. Mason & Brown, 2014; Spigel, 2017; Stam, 2015; Stam & Spigel, 2016; Startup Genome Project, 2012; World Economic Forum, 2013), less is known about how entrepreneurs engage with their ecosystem and how they acquire resources from them. Ecosystem research has focused on a macro-perspective of identifying ecosystem attributes and examining their outputs (e.g. Szerb, Acs, Auito, Ortega-Argilés, & Komlósi, 2014) rather than on the micro-perspectives on how entrepreneurs interact with their ecosystem. This makes it difficult to empirically verify the role of ecosystems and what benefits, if any, entrepreneurs gain from their engagement with it.

The purpose of this article is to critically examine the practices entrepreneurs use to engage with their local ecosystem and access the resources within it. Ecosystem engagement involves understanding how entrepreneurs connect with other entrepreneurial actors and

organisations designed to support venture creation and growth in their home region as well as how they access the financial, knowledge, human capital, and other types of resources there. Drawing on a set of 37 interviews with high-growth entrepreneurs in Edinburgh and Glasgow, Scotland, the paper argues that there are substantial differences in how entrepreneurs engage with their ecosystem based on factors such as their location, their industry, and their stage of development. This suggests that entrepreneurial ecosystems are not a monolithic entities but dynamic systems of relationships and resources which entrepreneurs strategically engage with. As a result, a more nuanced understanding of ecosystems is needed to go beyond defining the attributes of a successful ecosystem and instead explore the micro-level interactions that entrepreneurs have within their ecosystem.

Literature Review

Entrepreneurial ecosystems represent a particular arrangement of regional economic, social, cultural, political and economic factors that are conducive to formation, survival and growth of innovative new ventures, typically in knowledge-based sectors. Though the term 'entrepreneurial ecosystem' dates back more than two decades (Dubini, 1989), its more recent popularity is due to work in the popular business sphere by Dan Isenberg (2010) and Brad Feld (2012), which examined the creation of successful entrepreneurial regions. Both these as well as subsequent work by Brown and Mason (2014), Spigel (2017) and Stam (2015) amongst others sought to identify several key attributes of entrepreneurial ecosystems. These include cultural attitudes within a region, histories of entrepreneurship, strong social networks, research universities, mentors and role models, highly skilled workers, early stage investment from angel investors and follow-up investment from venture capitalists, supportive government policies, and

a strong local market have all been identified as key factors in creating and sustaining an entrepreneurial ecosystem (Spigel, 2017; Stam, 2015; World Economic Forum, 2013).

Drawing on earlier work on the entrepreneurial environments and the geography of entrepreneurship (Malecki, 1997; Peer, 1994; Spilling, 1996), the ecosystems literature has sought to explain the sustained ability of certain regions to produce a large number of high-growth new ventures. While having many similarity to previous concepts such as clusters and industrial districts, entrepreneurial ecosystems represent a development on this previous literature in three ways. First is the focus on high-growth, high-quality startups (Stam & Spigel, 2016). This is a shift from previous research which focused largely on the aggregate number of new startups created as a sign of a region's entrepreneurial potential rather than their quality or growth potential. Recent work suggests that only a small proportion of new startups account for the bulk of new job creation (Mason & Brown, 2013). These firms are centred around an opportunity with the potential for quick market growth and are structured in such a way to allow them to secure outside investment and scale up. Policies focused on aggregate levels of venture creation overlook the fact that high-growth entrepreneurs need very different types of support than lower-growth entrepreneurs, such as help getting access to venture capital and training on how to scale up (Motoyama et al., 2014).

Second, ecosystem research has emphasised the interconnections between different elements within a region's entrepreneurial environment and economy (Spigel, 2017). As argued above, entrepreneurial ecosystems are more than regions with high rates of startup creation; they are defined by the relationships between various attributes which help to reproduce and transform the ecosystem over time, creating durable environments and cultural outlooks that

catalyse high growth entrepreneurship. This in turn creates a resilient environment that sustains entrepreneurial innovation.

Third, work on ecosystems has highlighted the importance of leadership coming from entrepreneurs themselves rather than top down control from the state or philanthropic organisations. Unlike clusters or regional innovation systems, which rely on the state or large firms to create the necessary infrastructure and networks to propel economic growth, entrepreneurial ecosystems are often led by the entrepreneurs themselves who identify the issues that need to be addressed and create the organisations and institutions that drive the required change (Feld, 2012; Stam, 2015). Entrepreneurs are best positioned to identify the most pressing barriers to growth they are already skilled at quickly building new organisations to address needs in the market place. The role of the public sector is to act as a facilitator and connector rather than as the prime mover in the creation and growth of an entrepreneurial ecosystem.

Ecosystems as Practices

Existing work on entrepreneurial ecosystems has tended to examine macro forces like the institutional, political and economic factors that contribute to high rates of innovative entrepreneurship within a region. But these top down approaches provide little insight into the processes through which entrepreneurs' contextual environment supports the creation, survival, and growth of innovative entrepreneurship. While a necessary first step in the creation of a new sub-field, many existing studies treat the ecosystem aa a black box in which policy, cultural, and economic inputs lead to outputs of entrepreneurial innovation and growth. This suggests to a type of determinism in which entrepreneurs' contexts *cause* particular actions — such as quickly scaling up the firm — without reference to the entrepreneurs individual skills, talents, out outlooks. In the worst case, this can lead to 'voodoo' policymaking in which best practices are

copied from other regions with no regard for local contexts, histories, or cultures (Harrison & Leitch, 2010).

A practice-based approach to ecosystems provides a more nuanced, bottom-up perspective of entrepreneurial ecosystems. Practice-based approaches in entrepreneurship examine the specific strategies and actions entrepreneurs enact as part of their daily activities (Chalmers & Shaw, 2015; de Clercq & Voronov, 2009). Drawing on Pierre Bourdieu's sociology of practice, this approach views practices as emerging out of both an entrepreneur's intrinsic personality and goals as well the as formal and informal rules of their larger social contexts (Spigel, 2013, 2016a). The reflects a larger turn within management and organisational research towards practice-based theories in order to better capture the role of human agency in organisational effectiveness and change (Feldman & Orlikowski, 2011; Nicolini, 2010; Orlikowski, 2002).

Two types of practices are of particular importance in the study of entrepreneurial ecosystems. First, the practices through which *entrepreneurs access the resources held within the ecosystem*. Resources such as investment capital, skilled technology and business development employees, knowledge spillovers, and advice and mentorship are key a new venture's survival and growth. These resources are rarely freely available. They are frequently bound up in social networks, requiring that the entrepreneur expand their networks and develop legitimacy and trust within their own community if they are to access them (Anderson, Dodd, & Jack, 2010; Anderson, Park, & Jack, 2007; Greve & Salaff, 2003; Nijkamp, 2003). For example, angel investors and venture capitalists typically use their social networks to identify new firms to invest in and gauge the reputation and character of the founding team (Harrison & Mason, 1996; Powell, Koput, Bowie, & Smith-Doerr, 2002). This means that entrepreneurs' networking

practices, such as their willingness to attend networking events to build their network and establish their legitimacy within the community, will affect their ability to acquire resources from the ecosystem. Similarly, the willingness of entrepreneurs to talk with others about their business and learn from the experiences of others is a type of practice, requiring the establishment of trust in order to share proprietary information and potential market leads.

The second type of practice are those that reproduce and strengthen the ecosystem. Ecosystems are reproduced through actions that build and attract new resources to the ecosystem and enable their flow within the ecosystem (Spigel and Harrison, forthcoming). This might involve entrepreneurs creating their own organisations and communities to share their experiences and help solve their most pressing issues, as seen in Feld's (2012) description of Boulder's ecosystem or an individual deciding to take on the role of a dealmakers to broker connections between ecosystem actions (Feldman & Zoller, 2012). These practices increase the density of network connections within an ecosystem and create trust. Other types of practices help encourage the 'recycling' of entrepreneurial resources such as financial and human capital within the ecosystem after a successful or unsuccessful exit of an entrepreneurial venture. The willingness of successful entrepreneurs to return as serial entrepreneurs, angel investors, or mentors, can be considered a practice that emerges out of both their individual habitus as well as the extent to which these activities are normalised within their local field (Spigel, 2016a).

Methods

Empirical studies of entrepreneurial ecosystems are still in their infancy. Quantitative approaches such as Acs et al. (2014) or Guzman and Stern (2015) have focused on linking outcomes, such as the number of high growth firms or firm survival, with inputs such as economic structures or particular support policies. Qualitative approaches such as Spigel

(2016b), Motyoama and Knowlton (2016), and van Weele et al. (2016) have employed in-depth interviews with entrepreneurs and other ecosystem actors to examine the processes through which ecosystems develop, evolve, and provide resources and support to entrepreneurs. Qualitative approaches are more amenable for examining the complex connections between an entrepreneur and their regional economic social and economic environment because publicly available data cannot easily examine the social relations that make up ecosystems.

Case studies of Edinburgh and Glasgow Scotland were carried out to better understand how entrepreneurs in the two cities acquire and use localised entrepreneurial resources. Edinburgh is a mid-sized city with a strong entrepreneurial ecosystem. It is home to two 'unicorn' startups valued at over 1 billion USD, several research intensive universities, and a dense network of entrepreneurs and support programs and is the seat of government for the devolved Scottish state. The University of Edinburgh is a particularly important player in the ecosystem, with a world-leading informatics program that attracts global talent.

While Glasgow is a larger city with 1.5 million residents, it has never fully recovered from the de-industrialization of the 1960s. It has lower levels of entrepreneurship and scale up firms despite the presence of several research universities with strong entrepreneurship and technology commercialisation programs (Miller, 2014). Nevertheless, it has a strong history of creative entrepreneurship and currently is a hub for many digital design firms serving anchor organisations such as BBC Scotland and the Scottish NHS (see Table 1).

Both cities have identical taxation, legal, and financing environments. Economic policy is devolved to the Scottish government, with public organisations such as Scottish Enterprise operating or funding the majority of entrepreneurship support programs (Keating, 2005). Individual cities have relatively little power to enact local economic development or entrepreneurship support policies. While Edinburgh and Glasgow are only 60 miles apart, they have strong cultural differences and distinct entrepreneurial ecosystems and labour markets. In

Table 1: Demographic Profiles of Glasgow and Edinburgh

	Glasgow	Edinburgh
Population	1,209,000	482,000
Number of Growth Companies	178	206
Investment Raised (2014 to present)	£122,883,000	£337,181,000
Major sectors	Media, Digital Design, Apps	Digital Technology, FinTech, Sensors

effect, they operate as distinct entrepreneurial ecosystems with separate labour markets, cultural attitudes, investment communities, and regional specialisations.

Interviews with 25 technology entrepreneurs in Edinburgh and 12 in Glasgow, Scotland were carried out to better understand their perceptions of and engagements with the local entrepreneurial ecosystem (see Table 2). Interviewees were contacted randomly from a list of participants in the Engage/Invest/Exploit (EIE) program from 2014 to 2017, an entrepreneurship support program organised by the University of Edinburgh that provides entrepreneurial training and support for entrepreneurs in technology, life science, and energy sectors that culminates in pitches at Scotland's largest investment conference. While run by the University of Edinburgh, it

is open to entrepreneurs throughout Scotland. EIE participants are a useful population for this study because the programs 'curates' its participants, only working with entrepreneurs with the potential for strong growth. This allows the study to focus only on highly innovative firms while avoiding the biases associated with purposeful or snowball sampling techniques or the challenges of identifying potentially high-growth firms through inconsistent corporate databases.

Interviews focused on the types of resources entrepreneurs drew on as they started and grew their firms. This includes technical resources such as skilled workers, access to university knowledge spillovers, and specialised equipment, as well as more business-related resources such training, advice, and connections to customers and investors. Interviewees were probed about how they acquired these resources (e.g. through their own personal networks, through public training programs, or consultants) and how they used them within the business. To

Table 2: Interviewee data

	Glasgow	Edinburgh
n	12	25
Responce rate	33%	33%
Avg firm age	4.1 Years	3.3 Years
Employees	8.5	8.1
Average turnover	£350,000	£148,000

measure their engagement with the ecosystem, respondents were surveyed about the types of formal and informal entrepreneurship support programs they had engaged with in the past 12 years. Drawing on Spigel (2016b), a list of entrepreneurship support programs available in both cities were drawn up and a sample of 55 programs in Edinburgh and 53 in Glasgow were provided to entrepreneurs with relatively equal proportion of local and Scotland-wide programs listed for both cities.

Results

Networks and Resources

The most important types of ecosystem resources cited by interviewees was knowledge related to the firm startup and growth such as how to market products, plan for growth, and pitch to investors. Entrepreneurs learned about the entrepreneurship process from other entrepreneurs, enabling them to overcome business challenges. In the words of a sport software entrepreneur in Edinburgh: "You're talking guys that are selling ties through to people selling tech through to hair stylists and there's everything, but they all had lots of different things in common, like they all need legal advice, they all need accountancy and they all need banking." (ER11) The most frequent challenges facing entrepreneurs — how to scale up their firm, how to more effectively market their product, how to pitch to investors, and how to hire and manage effective employees — are the same across most industries. This means that entrepreneurs can learn from the experiences of others, even if they are in separate industries. For example, the founder of a sensor company in Edinburgh was able to learn from the experiences of an entrepreneur who founded a digital audio company and others, "so we can learn from each other because we are all doing quite different type of businesses, even though it's technology, very different technology." (ER17) However, as will be discussed below, entrepreneurs outside the digital technology space often saw little value in discussing business challenges with those outside their specific sector.

Entrepreneurs relied heavily on their personal networks to access this knowledge. Entrepreneurs tended to be very open with sharing advice with one another, particularly with how they are overcoming the challenges associated with scaling up. For example, one Edinburgh entrepreneur who makes a consumer smartphone app spoke about how he could turn to other entrepreneurs in his community for advice on matters such as office space: "So there's like Slack

groups [an online messaging service] of people, you know someone was asking about like office space and they were like “Who’s good? Who’s not good?” in terms of agents ‘cause they’re going, they would like three thousand square feet, so then all of a sudden you’re kind of like “Yeah well you should talk to this person.” (ER05)

This learning is enabled by a strong sense of trust within the entrepreneurial community, especially within Edinburgh. This trust can develop because there is a lack of direct competition between startups. None of the entrepreneurs interviewed believed that they were competing with other local firms, even when they were in the same general market they always saw differences in their target market or business models that meant that they were not in direct competition. For example, in the words of a location based services entrepreneur , “But I wouldn't see us having direct competition. From the within the Edinburgh scene, there's nobody that can springs to mind that doing exactly the same thing or close to what we're doing. But that said I wouldn't be concerned if there was” (ER13) Their shared experience as entrepreneurs allowed interviewees to be more open with other firm founders about the types of challenges they face than they would be with other types of advisors. In the words of a software entrepreneur from Glasgow: “From doing start ups you end up getting friends that are entrepreneurs. And you then share things, you share your issues. You share stuff with them that you wouldn’t share with other people or your employees.” (GR06) This allows entrepreneurs to be more open about their financial details or growth strategies because they are not concerned about a competitor benefiting from them.

Entrepreneurs did not generally use the ecosystem for technical knowledge like how to solve programming problems. The interviewed entrepreneurs said that they and their employees and partners were far more likely to turn to resources on the internet or technical conferences to solve problems and keep abreast of new developments rather than their friends and colleagues

within the local startup community. An academic entrepreneur in Edinburgh developing an enterprise software system believed that: "having such a technical background, working on the IT for years… so [technical issues] are the least of my problems right now. So I think just going online and looking up – I already know most of the framework that can be useful for my particular technology." (ER03) Similarly, an e-Commerce entrepreneur in Glasgow reported developing new technical skills by attending specialised conferences of global developers rather than tapping into his local networks: "it's got a great community of other developers that we get to meet at conferences. We're talking to the right people, we're in talks on, what's new in front end…So that's the best place that we can learn from this other than any kind of online blogs that you read." (GR04) While business knowledge relating to scaling a firm is generic enough that entrepreneurs can help each other, technical challenges are so particular to a firm that there is little chance of finding a solution locally.

Building and Using Networks

Many interviewees saw substantial value in strengthening their connections with other entrepreneurs in their ecosystem. Some entrepreneurs were able to obtain resources from their connections with other entrepreneurs: several interviewed entrepreneurs had found discounted or shared office space through their ties with other entrepreneurs and many had been introduced to potential mentors, investors, or employees. In addition, they are able to gather both the business knowledge discussed above along with more general emotional support and guidance from those who have encounter similar challenges to their own. These resources were only available to them because they had built up dense, durable, and trust-based relations with other entrepreneurs in the ecosystem over a period of years, often pre-dating their current venture.

Attending entrepreneurship events was a common way for entrepreneurs to build their social networks and ties with other actors in the ecosystem. In Edinburgh, there are many events aimed at new and growing companies, running from training sessions put on by government agencies to talks by successful entrepreneurs hosted by the University of Edinburgh School of Informatics to small, informal meetups organised by entrepreneurs themselves. While many of these events have an educational component, most entrepreneurs viewed them as a way to meet other entrepreneurs over drinks after the event rather than as a way to develop their business skills. This quote by a software entrepreneur in Edinburgh is representative of how most interviewees viewed these events: "I actually find with some of these events…most of the value there comes from the conversations you have with people and and the contacts as well. But also just a chance to sort of exchange ideas with your peers." (ER14). These events give entrepreneurs a chance to "see another entrepreneur, even if you haven't seen it for a while, say hi; he will immediately tell you the most recent developments in his company, you'll tell him the most recent development in yours, you'll share your pain, and just that is such a valuable experience. And share advice, of course." (ER03) Talking to other entrepreneurs at these events allowed interviewees to keep abreast of developments in the ecosystem (such as who has received funding or expanding) and benchmark their own growth against other firms at similar places in the firm lifecycle.

The networking and relationship-building aspect of event participation extended to long-term educational programs like EIE as well as other programs such as the Royal Society of Edinburgh Enterprise Scheme (a publicly funded technology entrepreneurship fellowship) and incubator programs like Entrepreneurial Spark. These programs created cohorts of entrepreneurs who went through the same training process, helping to develop strong trust-based connections

between entrepreneurs. Many entrepreneurs stayed in close contact with their cohorts after the programs ended, turning to them for advice and guidance. For example, a consumer software founder in Edinburgh retained strong connections with other entrepreneurs who went through the same accelerator program, saying that "my group from E-Spark is really helpful because they've known me since the beginning of the business, they know my skills and my weaknesses, they know how the business has been growing and that sort of stuff. You don't have to sit there and kind of catch them up on stuff. You can just hit the ground running and be like, 'So, this is where we are and this is what I need." (ER04) Another entrepreneur who participated in a leadership training program reported that: "So like every week meet up with someone and you know the age range in the programme's fairly good because there are people who are twenty years older than me so it's a nice place to also kind of, informal mentoring, where they know who you are and what you're about 'cause they've spent so much time with you." (ER07) Likewise, entrepreneurs in CodeBase — a private incubator in Edinburgh — found that the geographic and social proximity created by their co-location was key in helping them interact and learn from one another.

Extending their social networks by attending events and meeting other entrepreneurs provided resources beyond gaining entrepreneurial knowledge. Founders of fast growing firms also attend these events to identify new employees and get a sense of who would be a good cultural fit for the firm. A Glasgow software entrepreneur stated that: "I try and use networking events and developer conferences to go and find people as well, so Scotland JS for instance is a… the waterhole for JavaScript developers." (GR01) Even if they do not attend events with the express purpose of recruiting, the events connect entrepreneurs to the overall buzz of the

ecosystem and helps make them aware of potential employees and makes workers aware that the firm is looking to recruit.

Several interviewed entrepreneurs created their own events or programs to help build and maintain their networks. One entrepreneur, working with friends in the Codebase administration, organised a bi-monthly bar night for other technology entrepreneurs in Edinburgh. The goal was to provide a forum for members of the startup community to meet in an informal environment: "I've been involved in setting up the Commons which is a monthly drinking event which isn't huge, it's meant to be just social, but it's pure social, no pitching there you just get the team together for a more cohesive" (ER02) This group was able to get funding from local anchor firms like Fanduel because the company was also interested in using the event as way to keep track of the ecosystem and identify potential employees. Other entrepreneurs had created their own informal dinner group with other entrepreneurs at similar stages of development. In the words of the founder of the group:

> I run a thing where we have like a monthly dinner for start-up finders but who are kind of like not, it's invite only so it's not like, not open doors. It's only people who have kind of got to a certain point, who have the same sort of problems, have the same sort of discussions all having dinner together sort of thing and we bring in people to join that as well, so from London, which is quite nice 'cause then it starts kind of joining up that community a bit more. (ER05)

This group gives entrepreneurs — all of whom develop software-as-a-service products — a chance to discuss common issues. Several of the entrepreneurs have received substantial angel and venture capital investment, allowing them to provide guidance and mentorship to

entrepreneurs who are now looking for investment. The group is also able to invite up guests, such as investors from London; while one entrepreneur on their own might not be able to attract such a visitor the chance to meet several high-profile entrepreneurs is enough to entice a visit. Such activities help to reproduce and strengthen the ecosystem by creating new opportunities to build connections and drawing in new resources to the community.

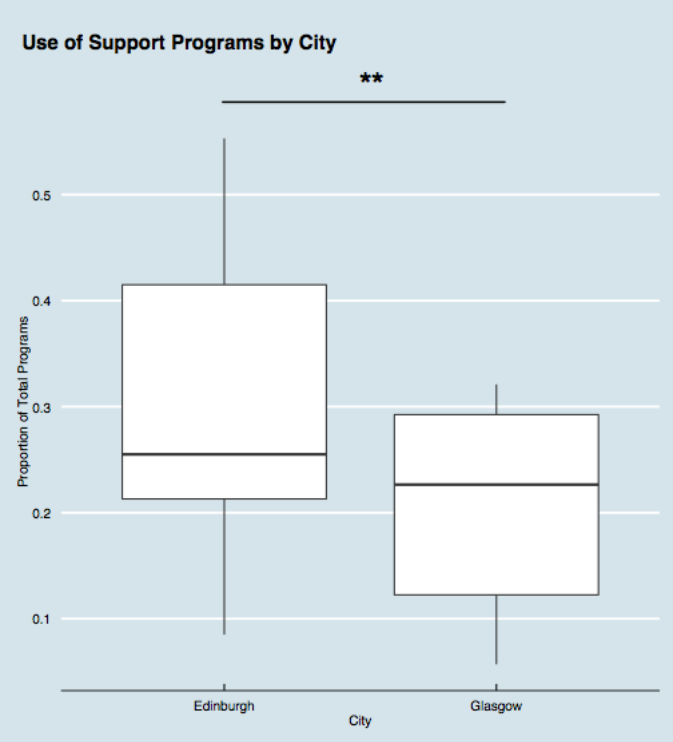
As their firms grew and their responsibilities increased, entrepreneurs strategically reduced the number of events they attended. Many interviewees followed a pattern similar to this software entrepreneur in Edinburgh, attending many events when they first started the firm but reducing their participation as they built up their connections of other entrepreneurs that they could use to get specific advice: “At the very first stages, it was knowledge, understanding and getting a feel for what the market is like, how businesses develop and so on, but now – but the more we go, the less I get interested in the talks themselves” (ER03) Several entrepreneurs only attended events when they had a specific need, such as identifying potential employees, as was the case for one Edinburgh software entrepreneur: “call it mercenary, but if we're hiring I'll go to a lot more events to talk to people.” (ER14) This suggests a very strategic employment of practices such as attending events as entrepreneurs try to balance the value of building their network within the ecosystem with internal firm needs.

Barriers to Ecosystem Engagement

Despite the general tendency of entrepreneurs to purposefully engage in their ecosystem, there were several factors that reduced founders’ willingness or ability to draw resources from their local environment. The first was geography: entrepreneurs in Glasgow were less likely to engage with their ecosystem or see the value in dedicating time and effort to building their own social networks. As shown in Figure 1, Glaswegen entrepreneurs engaged with signidigntly

fewer support programs than their Edinburgh counterparts: Entrepreneurs in Glasgow reported engaging with 20.6% of the available programs compared to 29.5% in Edinburgh ($t = 2.19$, $p < .05$).

The social connections between entrepreneurs in Glasgow are typically less strong than in Edinburgh. In the words of a Glasgow digital entrepreneur: "I think yes, there are other entrepreneurs in the City and I am aware of them, but in terms of you know, where we all meet, where a waterhole is, there's not really much of that going on" (GR01). Another entrepreneur suggested that socialising between Glaswegian entrepreneurs was lower than in other places: "I think compared to other communities like for example in Manchester and London, there are far fewer opportunities here in Glasgow to engage with other entrepreneurs" (GR04)



Part of this is due to the fewer number of entrepreneurial events and meetups in Glasgow as compared to Edinburgh. However, this is not simply an issue of supply driving demand: entrepreneurs in Glasgow typically saw less value in talking with and learning from other

entrepreneurs. Rather, many expressed a preference for spending more energy on their own firm. As one software entrepreneur in Glasgow explained that meetings with other entrepreneurs "…[I meet other entrepreneurs] only a couple of times a month, maybe three times a month…that's largely because I have to put so much time and energy into the business so I'm tending to kind of get out to events probably only about once or twice a season now whereas I was going pretty much like one or two a month for a while." (GR03) These entrepreneurs tended to obtain business knowledge from sources such as the internet, books on and by entrepreneurs, and training programs such as EIE. One digital entrepreneur in Glasgow described his method for learning about how to pitch to investors: "Google's always pretty handy for that, yeah I know I've always kind of followed big companies so I've seen their pitch decks for example and how they went about raising the money" (GR05). This is opposed to the typical experience in Edinburgh, where entrepreneurs often learned from the experience of other local entrepreneurs.

The second barrier to ecosystem engagement was the entrepreneurs' type of product. Interviewed firms can be placed into two categories: those that make a digital product ranging from a consumer smartphone app to enterprise-level software designed for major organisations like the NHS and those that make a physical product, such as a medical device, digital sensor, or advanced material. In total, 20 digital companies were interviewed (14 in Edinburgh and 6 in Glasgow) and 7 physical product firms were interviewed (6 in Edinburgh and 1 in Glasgow). Entrepreneurs with physical products typically said that they had little that they could learn from other firms, especially those with a digital product. For example, a medical device maker in Glasgow stated that: "I prefer talking to only medical device industry because it gets me somewhere. Normally I don't share a lot in common with consumer products or with agro-tech or whatever, because…I know I could be meeting people who are more niche and more useful to

what I'm doing so I always prefer talking only to people from the industry" (GR02). Many physical product preferred to develop their business skills by attending training classes or reading books, as was the case for a wind energy entrepreneur in Edinburgh "we just use our own internal knowledge and reading books. No, we didn't have any mentorship in that respect…to be honest with you I have been up to London Business School and focus on that." (ER15)

Discussion

Interviews with technology entrepreneurs in both cities reveal that the most valuable resource entrepreneurs received from the ecosystem was knowledge about the entrepreneurship process itself. Many entrepreneurs, especially those within the digital technology space, frequently spoke with or observed other entrepreneurs helping them to learn common challenges that face growing new ventures. These interactions allow them to learn how their peers have overcome these issues and preparing them for challenge before they encounter them. There is enough trust within the communities that entrepreneurs are comfortable sharing knowledge that would potentially help other startups, such as how to more effectively market their products. Some of this trust is engendered by the fact that there are few companies that are direct competitors, but evidence suggests that most entrepreneurs are also open about areas that are conceivably zero-sum, i.e. how to pitch to local angel investors.

The practices expressed in the interviews, such as learning business skills from other entrepreneurs or choosing not to communicate with other entrepreneurs, emerge from the unique combination of entrepreneurs' habitus and both the social field of their industry and that of their local ecosystem. A dominant force is the structure of the field of digital technology entrepreneurship (see Spigel, 2016). This field normalises the idea of frequent communication

with other entrepreneurs in order learn business skills like marketing along with the more informal and tacit skills like how to present themselves as 'legitimate' entrepreneurs to investors and colleagues.The influence of this field is clear in the perceived importance that many digital entrepreneurs attached to their informal meetings and collaborations with other entrepreneurs.

Entrepreneurs that operate outside of this field — those that made a physical rather than digital product — typically did not maintain frequent, informal connections with other entrepreneurs. This was because they saw less value in learning about the entrepreneurship process from other entrepreneurs, either because they thought the differences between their typical firm growth paths were too long or they believed that it was more important to spend time developing the firm rather than networking. As a result, these firms were often less embedded in the ecosystem and did not draw on the experiences or resources of the cohort of firms they had met at EIE or other programs.

The rules and norms of the digital technology field have been incorporated into the social field of Edinburgh's entrepreneurial ecosystem. The success of digital tech startups in Edinburgh have strengthened the norms of the digital entrepreneurship field locally by demonstrating their usefulness. These companies have taken a proactive approach to fostering communication in the ecosystem as well by sponsoring local entrepreneurship events and encouraging their senior technical and managerial staff to participate in the local entrepreneurial community. The structure of programs like EIE (which is run by a division of the University of Edinburgh's Computer Science / Informatics school) also normalises the collaborative learning associated with the digital entrepreneurship field. This field normalises certain practices found in Edinburgh, such as entrepreneurs proactively creating their own organisations and groups to address specific problems.

The lack of visible successes in technology entrepreneurship in Glasgow means that the rules and norms of the digital entrepreneurship field have not fully entered its local field. Because the city lacks a critical mass of scaling technology entrepreneurs as well as formal and informal events to create a forum for them to meet and interact, most entrepreneurs interviewed in the city either did not see the value in engaging with the ecosystem or did not feel that the rewards would be justified by the energy and time it would take to individually establish these connections themselves. This is a circular problem: the lack of events makes it difficult for entrepreneurs to create social ties, reducing the value of attending events. While Edinburgh is only a 40 minute train ride away the inconvenience of the commute and their lack of social connections with entrepreneurs there meant that few made the choice to attend events in Edinburgh unless they were directly relevant to their business.

As shown in Table 1, the different field configurations of both the entrepreneurs' local fields and the fields of their industry affect the practices that they employ to acquire vital resources from the ecosystem. Digital entrepreneurs in Edinburgh frequently turned to conversations with other entrepreneurs in the local ecosystem to develop their entrepreneurial and business skills. Entrepreneurs with physical products tended to draw more on business training programs, books, or internet sites, but with some maintaining connections with other entrepreneurs they had been through training programs with. Both digital and non-digital entrepreneurs in Glasgow tended to rely more on business training programs and internet resources. Similarly, entrepreneurs in Edinburgh drew engaged heavily with the 'buzz' in the ecosystem to identify new potential employees, while other entrepreneurs tended to rely more heavily on recruiters and resumes received from job ads to hire, with less success. All the entrepreneurs used the internet for technical knowledge and advice on how to solve technical

programs, through the proximity between digital entrepreneurs in incubators like Codebase did provide some opportunities for informal discussions between technologists.

Table 1: Practices used to acquire resources in entrepreneurial ecosystems

	Practice			
	Edinburgh		**Glasgow**	
Resource	Digital	Non-Digital	Digital	Non-Digital
Entrepreneurial knowledge	Informal conversations with other entrepreneurs at similar firm stages	Business training programs with some discussions with other entrepreneurs in their cohort	Business training programs with some discussions with entrepreneurs in similar sectors and advisors	Business training programs and some discussions with entrepreneurs in similar sectors
Employee leads	Ecosystem buzz through event attendance	Ecosystem buzz through event attendance	Recruiters and formal advertisements	Recruiters and formal advertisements
Technical knowledge	Internet sources / conferences, some discussions with other entrepreneurs	Internet sources / conferences	Internet sources / conferences	Internet sources / conferences

Conclusion

Research on entrepreneurial ecosystems has so far focused on the macro factors within a region that encourage the formation, survival, and growth of innovative startups. The extant literature has identified factors such as a risk capital, high levels of human capital, strong networks, and a culture that supports risk taking as key elements of successful entrepreneurial ecosystems. However, little is known about the heterogeneous ways in which entrepreneurs engage with their ecosystem and take advantage of the resources within it. Even if an ecosystem

is rich in entrepreneurial resources, if entrepreneurs cannot access them they will not be able to catalyse entrepreneurship-led economic development.

Drawing on a pilot study of two Scottish entrepreneurial ecosystems, this paper examined the practices entrepreneurs employed access resources in their ecosystem. The study suggests that entrepreneurial knowledge — knowledge about the business challenges associated with running a growing company — is one of the most important resources within an ecosystem. Entrepreneurs, especially those in the digital technology sector, used their connections with other experienced entrepreneurs to learn about specific skills, such as marketing or investment pitching as well as advice about how to overcome challenges. This activity has been normalised for members of Edinburgh's digital entrepreneurship community by both highly visible success stories of other entrepreneurs who employed these practices as well as through the numerous events and meetups for entrepreneurs. These practices emerged out of the field of digital technology entrepreneurship which has been incorporated into the field of Edinburgh's entrepreneurial ecosystem. However, the same cannot be said for digital entrepreneurs in Glasgow's field nor for product-based entrepreneurs in either city. For such entrepreneurs, engaging with their ecosystem in order to access the resources in it seems less valuable than dedicating that time and energy to building the business through other means.

This suggests that researchers should expect to see heterogeneous engagement with entrepreneurial ecosystems, even within seemingly dynamic and successful entrepreneurial communities. The existence of resources in an ecosystem is not enough: entrepreneurs nee to be willing and able to acquire them. Entrepreneurs will employ practices based on both the types of activities that have been normalised within the fields they operate in as well as their individual habitus based on their prior experiences, goals, and dispositions. These practices include the

development and maintenance of the social networks as well as the creation of new organisations to strengthen the ecosystem and encourage the recycling of human and financial capital after entrepreneurial exits. On a wider scale, the practices of entrepreneurs are crucial for building and maintaining a strong entrepreneurial culture that helps develop subsequent rounds of entrepreneurship.

Further research is necessary to better understand the complex practices that make up an entrepreneurial ecosystem. First, it cannot be assumed that strong engagement with the ecosystem is a positive thing. Too much time spent networking with other entrepreneurs distracts from the entrepreneur's main job of running a successful business. Currently there is only mixed evidence about the importance of being embedded in a local community for firm survival and growth. While the complex nature of entrepreneurship (in which firm failure might be a better outcome than continued slow growth) make it difficult to associate particular practices with positive outcomes, more research is necessary to better link ecosystem engagement with outcomes. A corollary to this is to investigate if firms that do not heavily engage with the ecosystem still reap benefits from it. Second, more detail is needed around the specific types of practices entrepreneurs employ and the types of resources or benefits they acquire. Beyond attendance at events, what other ways do entrepreneurs meet and learn from other entrepreneurs? Finally, more work is needed to explore the different array of resources entrepreneurs can acquire from the ecosystem, including material support like funding as well as more social resources such as emotional support and mentorship.

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